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Worldwide Report

TELECOMMUNICATIONS POLICY, RESEARCH AND DEVELOPMENT

No. 217

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CONTENTS

WORLDWIDE AFFAIRS

Briefs

USSR Agreement With Kampuchea 1

ASIA

AUSTRALIA

Disagreement Flares Over Domestic Satellite Issues
(THE AUSTRALIAN, 19, 22 Mar 82) 2

Choice of Bandwidth
Commercial Viability Questions, by Claire O'Grady

Government Computer Systems Put WA First Among States
(Graeme Atherton; THE WEST AUSTRALIAN, 20 Mar 82) 4

First Micro-Computer Information Service Begun in Melbourne
(THE AGE, 16 Mar 82) 5

BANGLADESH

Briefs

Overseas Phone Services 6

INDIA

Panel Criticizes 'Deteriorating' Phone System
(PATRIOT, 16 Apr 82) 7

Daily National Television Program To Begin in June
(PATRIOT, 16 Apr 82) 8

Plans for Use of First Domestic Satellite Told
(H. Kusumakar; THE TIMES OF INDIA, 4 Apr 82) 9

Foundation for TV Satellite Center Laid, Gandhi Speaks
(THE TIMES OF INDIA, 11 Apr 82) 11

Reporter Notes Shortcomings in INSAT Project
(S. Kumar; THE TIMES OF INDIA, 11 Apr 82) 12

Gandhi Address Mass Communications Institute
(THE TIMES OF INDIA, 14 Apr 82) 15

No Decision on Collaborator for Electronic Exchanges
(THE HINDU, 7 Apr 82) 16

Contribution to ITU for Communications Year Planned
(THE HINDU, 15 Apr 82) 18

Automatic Exchanges for All Districts by 1985
(PATRIOT, 19 Apr 82) 19

Briefs
Norwegian Phone Exchanges 20

NEPAL

Briefs
Telex Exchange Equipment Arrives 21

PHILIPPINES

Objections Raised on Integrated National Telecommunications System
(BULLETIN TODAY, 19 Apr 82) 22

LATIN AMERICA

BRAZIL

Communications Infrastructure With Europe, U.S. Set by 1990
(O GLOBO, 21 Mar 82) 23

Briefs
Satellite Report Delay 27
Microwave Stations in Rondonia 27
Possible DIGIBRAS Sale to Hungary 27

NEAR EAST AND NORTH AFRICA

IRAN

Briefs

New Television Relay 29

SUB-SAHARAN AFRICA

INTER-AFRICAN AFFAIRS

Briefs

'PANA' Meeting Scheduled 30

ANGOLA

Briefs

Luanda-Benguela Telephone Line 31

ETHIOPIA

Briefs

Resumption of Telecommunications 32

USSR

Briefs

Amplification of Radio Signals 33

WEST EUROPE

FINLAND

CP Minister's Ban of UK Satellite TV Stirs Outcry
(HELSINGIN SANOMAT, various dates) 34

Paper Concerned Over Wahlstrom's Ruling, Editorial
Conservatives' Chairman Charges 'Censorship'
Firm Vows to Continue Transmissions
Liberal Party Worried Over 'Freedom of Expression'
Minister Wahlstrom Defends Stand

FRANCE

Arianespace, American Shuttle Compete Economically, Technically
(Jacques Tiziou; AVIATION MAGAZINE INTERNATIONAL,
1-14 Mar 82) 40

NETHERLANDS

Briefs

Ericsson Supplying Mobile-Phone System 43

SWEDEN

Bill on Nordic Satellite System Appears To Fit Tele-X
(Bjorn F. Hansen; SVENSKA DAGBLADET, 4 Apr 82) 44

Mission, Function of Tele-X Satellite Described
(Roland Gyllander; DAGENS NYHETER, 17 Apr 82) 46

BRIEFS

USSR AGREEMENT WITH KAMPUCHEA--A long-term agreement and protocol were signed for the first time today in Moscow on cooperation in radio broadcasting between USSR state television and radio and the Voice of the People of Kampuchea radio. They provide for an exchange of radio material on the life of the peoples of the USSR and the People's Republic of Kampuchea and reciprocal assistance in preparing programs on major events in the life of the two countries. The documents were signed by Yuriy Viktorovich Orlov, deputy chairman of the USSR Committee for Television and Radio Broadcasting and (Van Sun Heng), acting general director of the Voice of the People of Kampuchea radio. [Text] [LD301118 Moscow Domestic Service in Russian 1000 GMT 30 Apr 82]

CSO: 5500/2217

DISAGREEMENT FLARES OVER DOMESTIC SATELLITE ISSUES

Choice of Bandwidth

Canberra THE AUSTRALIAN in English 19 Mar 82 p 17

[Text] A SATELLITE specialist's plea to the Australian Government to reverse its decision to use high frequency bands as a crucial part of its Aussat satellite strategy has sparked a major industry row.

Aussat Pty Ltd, the government-backed company which will own and operate Australia's domestic satellite system, has slammed suggestions made by Dr Norman Abramson that high frequency bands would prove inefficient as "grossly inaccurate".

Mr Graham Gosewinckel, general manager of Aussat, said yesterday "a tremendous amount of time and effort went into making this choice. Our final selection of high frequency bands instead of low ones was endorsed by overseas consultants."

The row erupted when Dr Norman Abramson, professor of electrical engineering and computer sciences at the University of Hawaii and a recognised world authority on satellites, warned that a plan to operate small dish antennae at high frequency levels could cost Australia an extra $500 million over the next 10 years.

The susceptibility of high frequency band widths, which transmit and receive signals between ground station dish antennae and satellites, to rain, would also mean that households in the Northern Territory would not be able to reap the benefits.

Exactly how much the Aussat satellite, which is due to be launched in early 1985, is going to cost Australia has yet to be worked out.

Commercial Viability Questions

Canberra THE AUSTRALIAN in English 22 Mar 82 p 20

[Article by Claire O'Grady]

[Text] THE recent row between Aussat Pty Ltd, the Government-backed body which will own and operate Australia's first satellite, and a world communications specialist has raised a question mark over the future financial viability of the system.

The dispute erupted late last week when Dr Norman Abramson, professor of electrical engineering and computer science at the University of Hawaii, warned that a plan to operate smallish antennae at high-requency levels could cost the country an extra $500 million in the next 10 years.

Exactly how much the satellite will cost Australia has yet to be worked out. Negotiations between the big US Hughes Corp, which will build the system, and the Fraser Cabinet are said to be continuing.

But in a special statement to the Australian, Mr Graham Gosewinckel, general manager of Aussat Pty Ltd, slammed Dr Abramson's suggestions as "grossly inaccurate".

High-frequency band widths, he maintained, would still be used.

It is the use of these high-frequency band widths, which are used to transmit and receive signals between ground-station dish antennae (user earth stations, they are sometimes called) and satellites, which is at the heart of the dispute.

When the Hughes satellite system for Australia, AN HS376, goes into orbit in early 1985 it will beam signals at a high frequency level.

But even though Australia is the last developed country in the world to join the satellite race, the move toward high frequency levels is not new.

In the US, IBM's Satellite Business Systems model is already using high-frequency band widths, while the Canadian Telesat and the French PTT are poised to operate satellites in this frequency range.

Hughes, which has designed and built communications satellites for a host of users, including Western Union, Comsat, and General Corp, will be putting its newest system into orbit for the Australian contract.

The future commercial success of the HS376 spacecraft will rely ultimately on the outcome of the Australian network.

The HS376, which can be launched from a variety of space vehicles such as Delta-class vehicles or the space shuttle, can deliver voice, video and facsimile in configurations tailored to the specific needs of customers.

Design life options of spacecraft based on the HS376, owing to increased onboard fuel capacity and other technological improvements, can be extended from seven years to 10, Hughes Corp claims.

To say that the HS376 is the latest technologically advanced communications satellite offering would be to underestimate what is probably one of the most sophisticated models around today.

Weighing approximately 1055kg, the HS376 carries its own Apogee motor, which is fired to place the satellite into orbital position in space.

The marriage of satellite technology with the processing power of the computer has slashed the cost of global information transmission making this form of communication the most lucrative ever conceived.

The natural emergence of rival satellite consortiums in Australia like Business Telecommunications Services Pty Ltd, and the media group launched during late 1980 has split the Australian satellite market wide open.

This is a development that must surely put greater pressure on the Aussat system to be an overwhelming success.

The recent plea by Dr Abramson to the Fraser Cabinet to make a U-turn in its satellite strategy and adopt low frequency bands has focussed attention on just this: the inherent vulnerability of a satellite on which so much depends.

Dr Abramson maintained that if high frequency levels were used in the Aussat system, not only would they add an extra $500 million to the country's satellite bill, but their use could also mean that households in the Northern Territory would not be able to reap the benefits.

The susceptibility of high band widths to rain — it rains a lot in the Northern Territory — would jar signals, making television programmes, for example, unwatchable.

Low frequency levels, stressed Dr Abramson, were cheaper and could operate under all weather conditions.

But Mr Gosewinckel hit back: "People in the NT and other remote parts of Australia would be able to pick up the satellite signals."

He added: "Dr Abramson's view that the use of low frequency levels for the Australian system would permit the reception in remote areas of television programmes grossly in accurate."

CSO: 5500/7533

GOVERNMENT COMPUTER SYSTEMS PUT WA FIRST AMONG STATES

Perth THE WEST AUSTRALIAN in English 20 Mar 82 p 10

[Article by Graeme Atherton]

[Text] Two big new computer systems being developed by the State public service will put WA in front in the technological revolution.

But as well as breaking important new ground in the storage of official information, the new systems could provoke fresh concern about the invasion of privacy by government data banks.

A new justice/welfare information system is scheduled to start operating with next month's opening of the new Central Law Courts building in St George's Terrace.

It will record information affecting all departments involved in justice related procedures—from the time a crime is committed until the offender has served his sentence.

Police investigations of criminal suspects, court appearances by offenders, witnesses, jurors and officials, sentencing and parole and other details will be filed on the central computer.

Private information supplied by welfare agencies in cases involving juvenile offenders will also be recorded—but police access will be restricted.

Information stored in the computer system will enable detailed studies of the nature and circumstances of crime and the punishment.

The lack of such information was criticised by the former Ombudsman, Mr Oliver Dixon, during his recent inquiry into WA's high rate of imprisonment.

The other development will bring together in one system information from numerous government departments on all aspects of land use and ownership in WA.

A register of all owners of freehold land in WA, together with a legal description of the land and its geographic location, will be included.

A similar register will be kept of all crown land in the State.

The new system will speed up title searches and surveys of land for conveyancing purposes.

The chief executive officer of government computing, Mr Dennis Moore, said yesterday that WA had become a trend-setter in the use of computers in government.

"We're big enough for this to happen, but still small enough for people to talk to each other," he said.

"This has enabled a tremendous degree of co-operation between departments which other States just haven't been able to achieve."

But Mr Moore said, that the Government was concerned about privacy issues.

Because of this concern, the police computer system would be separated from the justice system to prevent the police using certain private information about individuals.

CSO: 5500/7533

FIRST MICRO-COMPUTER INFORMATION SERVICE BEGUN IN MELBOURNE

Melbourne THE AGE in English 16 Mar 82 p 34

[Text] **Australia's first information service for micro-computer users was launched in Melbourne yesterday by the Minister for Economic Development, Mr Ramsay.**

The service will give micro-computer and word processor users access to central mainframe installations.

Using the service, called The Australian Beginning, users will be able to access a wide variety of information sources and data banks, including such things as news, the weather, airline schedules and investment advisory services.

The managing director of AB, Mr Gary Alpert said: "We are offering one of the most revolutionary computer packages available on the Australian market today.

"Micro computer users and word processor users who have already invested in a system, or are about to invest in a system, will realise what a great opportunity this is.

"For only a few dollars extra, they can substantially enlarge the capabilities of their systems," said Mr Alpert.

He said the service would allow them to receive hundreds, and in some cases, thousands, of free programmes.

"This is worth thousands of dollars to system owners who would otherwise have to spend substantial sums to find and buy these programmes individually.

"It is no longer a question of a businessman or mircro-computer owner asking whether he needs a system like this. It is more a question of . . can he afford not to."

Computer owners who join the service will be able to access AB's computer via telephone.

Mr Alpert described the launching of Australian Beginning as being a most "revolutionary event".

"It is certainly one of the most important events that has taken place in the computer industry over the past few years in this country.

"We believe it will make a number of fundamental changes in the fabric of Australian society," he said.

CSO: 5500/7532

BRIEFS

OVERSEAS PHONE SERVICES--Due to introduction of Intelsat V Satellite System in the Indian Ocean region in May 1982 Betbunia Satellite Earth Station will undergo a planned modification programme from April 21, 1982, says a PID handout. The modification will continue up to May 25, 1982. During this period Betbunia Satellite Earth Station will be off the air and all international telephone services will be diverted through Talibabad Standard "B" Satellite Earth Station. However, it is expected that there should be no delay in passing of Overseas Trunk Calls of the subscribers. In some cases calls to distant stations may utilise double hops of Satellite Communication in which case there will be slight time delay noticed by the subscribers to get reply from the other end during their conversation. The Eurovision programme of Television News will however, continue without any interruption. [Text] [Dacca THE BANGLADESH OBSERVER in English 14 Apr 82 p 8]

CSO: 5500/7125

PANEL CRITICIZES 'DETERIORATING' PHONE SYSTEM

New Delhi PATRIOT in English 16 Apr 82 p 4

[Text] The committee on Public Undertakings (PUC) has criticised the deteriorating telephone system in the country, reports PTI.

The phenomenon of dead telephones, wrong calls, cross talks and other disturbances not to speak of overbilling, is a common occurrence PUC said in its 38th report on Indian Telephone Industries Ltd—research and development and new projects, presented in the Lok Sabha on Thursday.

The system seemed to have deteriorated steadily, it said.

The committee observed that it is a pity that during the last more than 30 years the ITI could not perfect even the telephone instrument.

The latest design with the Japanese dial though an improvement over the present design was not free from some major defects associated with the receiver and the transmitter.

It urged that there should be no further delay in the import of technology, which was inevitable. A decision taken in December 1977 to import know-how for the manufacture of telephone was yet to be carried out.

With the rapid change in technology there was 'regretably a gap of at least a decade' between our country and abroad, it said.

The committee said limited resources of R and D, unreliability of components and sub-systems and lack of product engineering expertise had hardened the country's development.

ITI, however, seemed confident of replacing most of its product lines by entirely modern and reliable ones within the next five to six years' time provided its products and collaboration proposals were cleared speedily.

The committee had expressed the hope that the Ministry would approach the task with a sense of urgency that it deserved. The committee observed that there was no doubt that production engineering and quality control in the ITI were not sound.

CSO: 5500/7121

DAILY NATIONAL TELEVISION PROGRAM TO BEGIN IN JUNE

New Delhi PATRIOT in English 16 Apr 82 p 10

[Text] A DAILY national programme will be relayed from Delhi Doordarshan and simultaneously telecast by all TV centres in the country from 1 June, 1982.

According to Information Ministry press release, Doordarshan is embarking on this new exercise taking advantage of the networking facilities being established through INSAT-I and P and T microwave links.

The national programme, which is due to last one and a half hours every day from 9 p.m. to 10.30 p.m., will initially be introduced from Delhi, Mussoorie, Bombay-Pune-Bangalore and Madras stations that are already linked up by P and T microwave circuits. Other TV stations will start the programme as and when they are linked with Delhi through INSAT-I or microwave circuits.

As is known, the scheme for utilisation of INSAT-I for TV provides for linking all Doordarshan Kendras through the satellite. Efforts are being made by Doordarshan to utilise this facility for telecasting TV programmes soon after the satellite becomes operational in June, 1982.

The programme will also be relayed by the new transmitters being set up under the INSAT scheme in Andhra Pradesh, Orissa, Bihar, UP, Gujarat and Maharashtra. Of added importance is the fact that 14 transmitters are being set up in different parts of the North-East region for the purpose of having the programme relayed in this area. Initially seven transmitters will be set up in each of the seven State Capitals of Assam, Arunachal Pradesh, Nagaland, Manipur, Meghalaya, Tripura and Mizoram.

The national programme will include two national news bulletins, one in Hindi at 9 p.m. and the other in English at 10.15 p.m. The bulletins will carry national and international news with visuals. All TV centres will regularly feed Delhi Doordarshan with news and visuals through microwave links and the satellite. Doordarshan Kendras will, in addition, continue to telecast their own regional news bulletins.

The programme will be mainly in English and Hindi and the emphasis will be on information, education and entertainment alongwith stress on unity in diversity of the Indian culture, traditions, music and dance, the objective being promotion of national integration. The educational items would be related to family welfare and health, science, environment and sports. Entertainment items are to include plays, skits and other popular features.

CSO: 5500/7121

PLANS FOR USE OF FIRST DOMESTIC SATELLITE TOLD

Bombay THE TIMES OF INDIA in English 4 Apr 82 p 9

[Article by H. Kusumakar]

[Text] BANGALORE, April 3.

INDIA'S first of the two national satellites (INSAT), designed specifically for the nation's requirements by Ford Aerospace and Communications Corporation (U.S.), will be launched into space on April 8.

Within about 43 hours after lift-from Cape Canaveral (U.S.), the satellite will be located somewhat west of Delhi over the equator. A month later, it becomes operational.

The second satellite, identical to the first in all respects, is under integration now. Its launch is slated for July next year. It will be slotted into space east of Calcutta. This spacecraft will be a spare in the Rs. 275-crore INSAT system.

Each of the two satellites will have a life of seven years, some 35,680 km above the earth. Once placed in their geostationary orbits, the satellites will match earth's 24-hour rotational period and thus remain stationary over a fixed point on the globe.

What will the INSAT system do? The system has several segments. The first to be taken up for implementation are the space segment, which includes the launching of the two satellites called INSAT-1 and INSAT-1B, establishment of a master control facility at Hassan in Karnataka, a telecommunications ground segment and a meteorological ground segment. Then will follow a radio networking ground segment and an initial television ground segment.

UNIQUE SYSTEM

During orbit-raising activities, the master control facility at Hassan will be supported by remote tracking station services from Andover (U.S.) and Carnarvon (Australia). The Hassan facility, now fully operational, has specific functions in satellite commanding, ranging and testing, reception and processing of satellite telemetry, ranging and test data and orbital analysis.

The first generation INSAT system represents India's first step towards implementing "operational" space systems for identified socio-economic objectives. It is intended for long-distance telecommunications (telephony, data and facsimile), round-the-clock meteorological earth observation and data relay, direct TV broadcasting to augment community TV sets in rural areas and networking of terrestrial TV transmitters and regional and national networking of radio transmitters. In its multipurpose nature, the system is unique.

NO CROSS-TALKING

The enhanced meteorological data provided by the INSAT system will benefit agriculture, aviation, ports and shipping and hydro-meteorological and flood forecasting services, with data coming in half-hourly. Compared to pre-satellite methods, some 12 to 24 hours advance identification of cyclones and consequently early warnings will be possible. A meteorological data utilisation centre has been located at the premises of the India Meteorological Department at Lodi Road, New Delhi.

The telecommunications component will provide over 8,000 two-way long-distance telephone circuits potentially accessible from any part of India, even the remotest without regard to intervening terrain and terrestrial distances.

Telephone subscribers getting connections to their long-distance points via INSAT and who have not previously experienced a satellite circuit, will find a difference. If the call is through INSAT, the telephone signal has to travel far into space and back. To avoid a user hearing his own voice echoed back to him, an "echo suppressor" has been devised which inserts an impedence into the reverse path when a person talks and removes the impedence when he stops talking.

Briefly, cross-talking is not possible. Elsewhere, the use of satellite communications has resulted in increased politeness of telephone conversation because of this.

Radio networking via INSAT is designed to provide a reliable and high-fidelity five-channel regional as well as national capability.

All India Radio plans to deploy 94 five-channel radio networking receive-only terminals by the end of 1982 or early 1983 in a phased manner. In the meantime, Delhi, Trivandrum, Ahmedabad, Gauhati, Srinagar, Dibrugarh, Bhopal, Hyderabad, Imphal and Kohima will have radio networking via INSAT.

The space segment of INSAT will provide two nationwide TV broadcast channels for direct satellite-to-augmented-community-TV-receivers in rural parts where direct satellite TV coverage has been deemed to be more cost effective, and national or regional networking of terrestrial transmitters.

The constraining factor in large-scale growth of INSAT TV utilisation is essentially the investment involved in the provision of community TV receivers. It is to be noted that reception of any programme broadcast from one terrestrial TV station at other stations of Doordarshan will depend upon the active transmission of the programme up to the satellite and its reception and rebroadcast at the other stations.

The government has plans for replenishment of the first generation INSAT spacecraft, procured from abroad, from 1990-91. The space research and development profile for the

1980-1990 decade provides for design, fabrication and launch of proto-INSAT, the second generation INSAT test spacecraft called INSAT-II. The current time-line for the launch of proto-INSAT is late 1986 or early 1987.

The definition of the functional requirements of proto-INSAT has commenced in co-operation with agencies participating in the INSAT system — P & T department, Indian Meteorological Department, All India Radio and Doordarshan. It is to be noted that APPLE, the Indian experimental communications technology satellite, launched in June 1981, has been the first major step in the direction of developing indigenous capability for design, fabrication, qualification, testing and mission management.

CSO: 5500/7115

FOUNDATION FOR TV SATELLITE CENTER LAID, GANDHI SPEAKS

Bombay THE TIMES OF INDIA in English 11 Apr 82 p 9

[Text] Nagpur, April 10 (UNI). The Prime Minister, Mrs. Indira Gandhi, today exhorted scientists and Doordarshan officials to make ready the necessary software for ultimate success of the Indian satellite programme for the benefit of the country's rural masses.

Addressing a huge gathering on the occasion of laying the foundation of the national channel of All India Radio and the Doordarshan satellite television centre at Seminary Hills here, Mrs. Gandhi said there were sufficient talented people who could take up the challenge to modernise the country and improve the quality of national radio and television programmes.

Mrs. Gandhi said that the people were conscious of the increasing importance of radio and television in national developmental programmes as both the media were easily intelligible.

She observed that radio and television needed to be utilised more effectively and this would soon become a reality with the increase in the number of available channels, making it possible to broadcast and transmit to a wider audience different programmes representing all shades of opinion.

Earlier, the union information and broadcasting minister, Mr. Vasant Sathe, said it would be his ministry's endeavour to improve the quality of radio and television programmes to suit national interests.

The chief minister, Mr. Babasheb Bhosale, said the foundation of the television relay centre in Nagpur marked an important chapter in Maharashtra's history of achievements.

Mrs. Gandhi arrived half an hour behind schedule after visiting the social worker, Baba Amte, at Anandwan, in Warora, and the Sarvodaya leader, Acharya Vinoba Bhave, at his Paunar ashram.

The foundation for the administration building of AIR's national channel transmitter here marks the first phase of a Rs. 80-crore proposal to set up a proper and exclusive outlet for broadcast of national programmes to listeners all over the country.

The proposed national channel network will comprise setting up highpower transmitters in Nagpur, Bangalore and Vadodra, along with a number of medium- and low-power medium wave transmitters.

CSO: 5500/7118

REPORTER NOTES SHORTCOMINGS IN INSAT PROJECT

Bombay THE TIMES OF INDIA in English 11 Apr 82 pp 1, 9

[Article by S. Kumar]

[Text] Bombay, April 10. Lack of advance planning, lop-sided priorities and poor coordination may turn the multi-crore commercial satellite--INSAT into a "white elephant".

The precious life-time of the satellite is being wasted for periods ranging from several weeks to many months, as the ground facilities have not yet been fully commissioned to avail of all the benefit from the satellite.

To save the satellite-time, in telecommunications segment, even the gaps of a few seconds available during telephone conversations are not wasted and techniques have been evolved to transmit some other channel of conversation during such gaps.

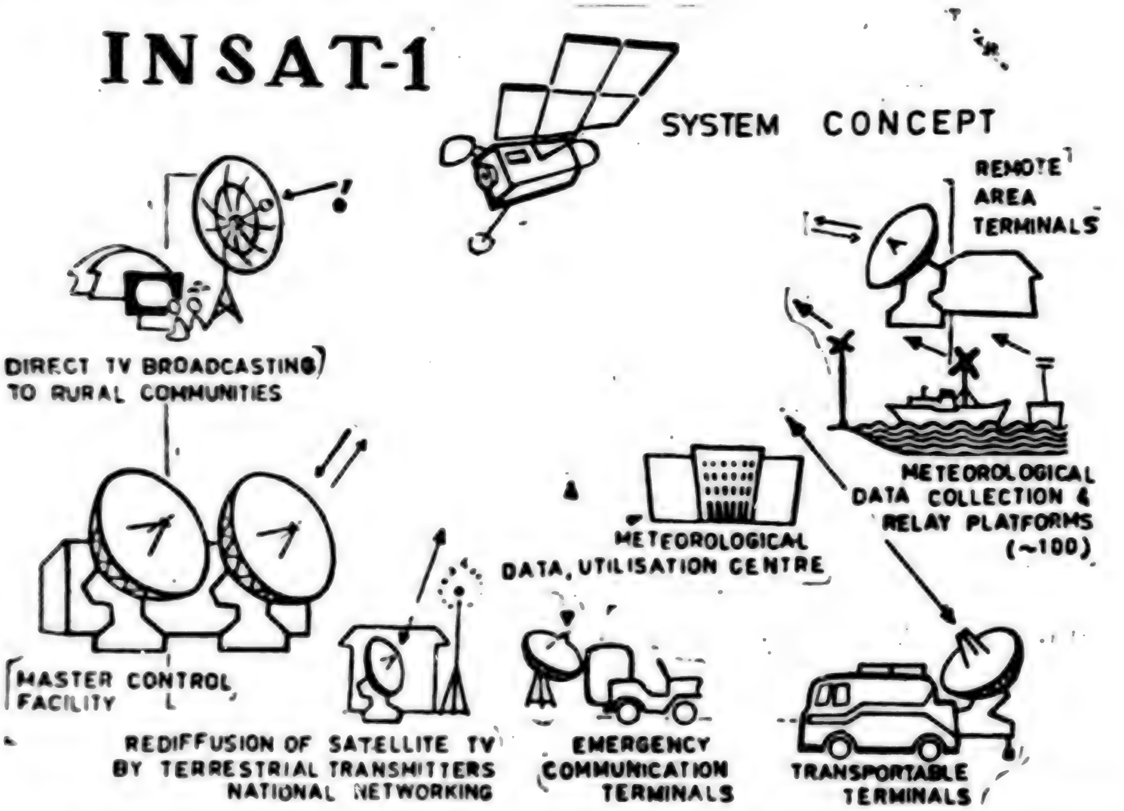
Only the earth stations in Delhi, Bombay, Calcutta, Madras and Shillong seem to be somewhat ready for transmitting and receiving signals from INSAT. It is not known when the rest of the promised medium and small earth stations will become operational.

One of the objectives of INSAT is to telecast programmes to rural areas but till date not a single programme has been made for that purpose. The TV stations are functioning as if INSAT does not exist. The planning commission had turned down the earlier proposals of Doordarshan as INSAT programmes did not enjoy any priority. It will be futile to beam the existing urban-oriented programmes to the rural areas and the present facilities and manpower in TV stations are already under great strain.

According to a spokesman of Doordarshan, at least two years before the launching of the satellite, funds should have been earmarked and programmes planned. It is learnt that recently some funds have been allocated for the TV programmes.

Take for instance Nagpur where an earth station is to be set up for telecasting TV programmes to the rural areas. Even the survey of electrified villages in the area has not yet been completed and the target-villages not yet chosen.

About 2,000 villages in just 19 districts are expected to be covered by INSAT-transmitted TV programmes. Each village needs a community direct receiver set (with special TV antenna) which may cost around Rs. 15,000. Just now, the Electronic Corporation of India is being approached for making the 2,000 sets. Even ignoring the vast financial outlay required for providing community TV sets and direct receivers, it is not known how long the manufacture of the equipment will take.


INSAT-1
SYSTEM CONCEPT
REMOTE AREA TERMINALS
DIRECT TV BROADCASTING TO RURAL COMMUNITIES
METEOROLOGICAL DATA COLLECTION & RELAY PLATFORMS (~100)
METEOROLOGICAL DATA UTILISATION CENTRE
MASTER CONTROL FACILITY
REDIFFUSION OF SATELLITE TV BY TERRESTRIAL TRANSMITTERS NATIONAL NETWORKING
EMERGENCY COMMUNICATION TERMINALS
TRANSPORTABLE TERMINALS

sets and direct receivers, it is not known how long the manufacture of the equipment will take.

According to observers, even the Satellite Instructional Television Experiment (SITE), conducted with the loaned services of an American satellite, was well-planned. SITE covered 2,400 villages and the special programmes were ready six months before the launching of the programme.

Doordarshan may have to be content with simultaneous relay of the Republic Day parade or Independence Day celebrations from Delhi to a few state capitals for a couple of years to come.

Even in the weather front, special data collection platforms have not yet been set up. However, Delhi may be able to receive the weather data soon. After all, for the past many years, the Indian meteorological department has been receiving weather data transmitted by foreign satellites. INSAT will cover a wider area of the country and relay the data for a longer period.

Turning to the telecommunications segment, five major cities are expected to be linked by satellite telephone communications from May 20, a full 40 days after the launching of the satellite. There is a provision for 8,000 telephone circuits to be shared by these five centres, which forms a fraction of the current demands for the telephone lines.

Satellite communications will be better in quality compared to the present microwave or coaxial cable communications channels. But, the bitter fact remains that neither the over-worked telephone exchanges nor the instruments can be improved by INSAT. Perhaps, an immediate advantage of INSAT can be found in establishing emergency communications with inaccessible areas during natural calamities.

INSAT is an "adopted" child. Just as the satellite the master control facility at Hassan and all the earth station equipment were also made abroad. The Post and Telegraphs department, for its own reasons, hurriedly imported the equipment three years ago. The launching of INSAT itself was delayed by more than a year. Indian scientists offer to manufacture earth station equipment indigenously was then turned down by the department "for lack of time".

Indian scientists have already proved their ability to build a fairly large earth station and the Arvi earth station is a standing example. They have lost a valuable opportunity to gain first-hand experience in fabricating a large number of sophisticated equipment and the chance to create sufficient trained manpower. By the time sufficient number of people are trained in this technology, the existing facilities woud have become outdated and the vicious circle of easy import would continue.

To discount the suggestion that INSAT-I is an expensive proposition for a developing country like India, the U.S. International Communication Agency quotes Prof. S. Dhawan, chairman of the Space Commission, as saying: "Even though only one of the three services — the telecommunications part — has any revenue-earning capacity, the satellite will yet be able to pay for itself within three years. In that context, the money spent on the satellite system is small."

"Our approach is that in the next ten years there will be a gradual transformation of experimenting with systems and the building of capabilities to the utilities of them".

A scientist compared the launching of INSAT-I to that of India buying the first Boeing — we are still buying the foreign-made aircraft.

Another said on the launching of INSAT that he did not even have the thrill he experienced when the indigenously fabricated APPLE was launched last year. However, he was anxious that the spacecraft should be safely berthed in the geo-stationary orbit. Though INSAT has been insured in the event of any mishap, again an Indian insurance company had to shell out a staggering amount.

CSO: 5500/7118

GANDHI ADDRESS MASS COMMUNICATIONS INSTITUTE

Bombay THE TIMES OF INDIA in English 14 Apr 82 p 15

[Text] NEW DELHI, April 13 (PTI).

THE Prime Minister, Mrs. Indira Gandhi, said today that she does not favour giving autonomy to radio and television right now.

Addressing Indian and foreign scholars of the Indian Institute of Mass Communication (IIMC) here, she said, "We have to use radio and TV to get through to the people development programmes of gigantic proportions."

There was a need to build people's self-confidence and where the press did not co-operate, it was necessary for radio and TV to step in and play the role of confidence-builder, she said.

Noting that the opposition viewpoint should also be projected in the media, Mrs. Gandhi said the overall objective should be to build up a congenial atmosphere for development.

She said that in some developed countries the home office or the foreign office does exercise pressure over the press and their press does not object to it. "We don't even have that power here," she said.

Asked what could be done to ensure that the big Indian papers used more news from the non-aligned world, she said, "We can only try persuasion."

Mrs. Gandhi said that the western press and much of the Indian press attacked the non-aligned news pool saying that the media in the non-aligned world was largely under the control of authoritarian regimes.

"My answer is that may be. We will get government controlled news. But at least we get that. Others are free to give their versions. We don't stop them and we get both points of view," she said.

The main world news agencies operated from Europe and America and they projected only the point of view of the countries of those regions, Mrs. Gandhi said.

Mrs. Gandhi said that the non-aligned movement was "very relevant" today. The fact that more and more countries were joining it provides evidence of its relevance. Even the aligned countries were adopting non-aligned postures, she said. She agreed with a questioner who said that the non-aligned countries were not a "solid, united group", but asked, "which group is united?". The military blocs also have internal differences, she pointed out.

India, she said, approached American and European countries in its efforts to develop steel and oil, but it was the Soviet Union which finally helped build the country's steel plants and exploit oil resources.

On the arms race in the sub-continent, she said, "We were not speaking of Pakistan's acquisition of arms out of fear. We said induction of arms would increase tension and bring the world closer to confrontation."

On the forthcoming Indian cricket team's tour of England, she said, "No Indian team will play with any team that has played in South Africa." When she had allowed the MCC to tour India last winter, she had consulted some African leaders, she said.

CSO: 5500/7119

NO DECISION ON COLLABORATOR FOR ELECTRONIC EXCHANGES

Madras THE HINDU in English 7 Apr 82 p 9

[Text]

NEW DELHI, April 6.

Some major considerations have thrown up a big question mark over the choice of collaborators for the two proposed factories to manufacture the equipments for electronic exchanges during the Sixth Five Year Plan.

The Posts and Telegraphs Department is deeply worried over these developments which are bound to delay decisions. The cost of the factory, earlier estimated at about Rs. 65 crores, has already gone up to over Rs. 100 crores. It will climb even higher if the decision is further delayed.

FACE favoured: No decision has yet been taken on the choice of the collaborator for the manufacture of a new model telephone, though a technical committee had favoured FACE, the Italian subsidiary of International Telephones and Telegraphs (ITT) of the U.S., against Siemens of West Germany.

There are two major considerations in respect of the electronic exchanges. The first is whether the choice should rest on the basis of the technical evaluation of the tenders made by the competing bidders, or the offer from the French company Cit-Alcatel, should be accepted under a larger technical cooperation agreement between the Governments of India and France.

The second point is whether the scope of the collaboration should be widened to include the manufacture of electronic components also in India. Both Siemens and ITT are reported to be willing to make offers for this.

Proven system: Among the considerations which the evaluation of the tenders will have to take into account will be the capability of the parties to offer a proven system.

One of the factors which had weighed against FACE of Italy but later ignored as not being of much consequence was, that the Italian P and T administration had not wholly accepted it. A similar situation exists in respect of Siemens regarding its own system for electronic exchanges.

According to reports from Germany, the digital exchange system offered by Siemens is still under field trials being carried out by the West German P and T administration, Bundespost, along with the equipment supplied by two other companies, Standard Elektrik Lorenz, a subsidiary of ITT and the Dutch Philips group.

Though the French Government had earlier made a determined bid to get the contract for the electronic exchange factory under an inter-governmental cooperation agreement, later the French company Cit-Alcatel, also participated in the global tender, floated by the Indian Telephone Industries (ITI). The other bidders were Siemens of West Germany, ITT of U.S., British Telecom, GTE of U.S., NEC, Hitachi and Fujitsu of Japan and Philips of Holland.

Evaluation: The P and T has been asked to complete the evaluation of the tenders as quickly as possible. The technical documentation submitted by the companies is now under examination and matters relating to the financing of the projects will be taken up later.

There is some satisfaction among the other bidders that the French company's offer will also go through the process of evaluation. But they are also aware that nothing commits the Governments to choose a collaborator purely on the basis of technical evaluation.

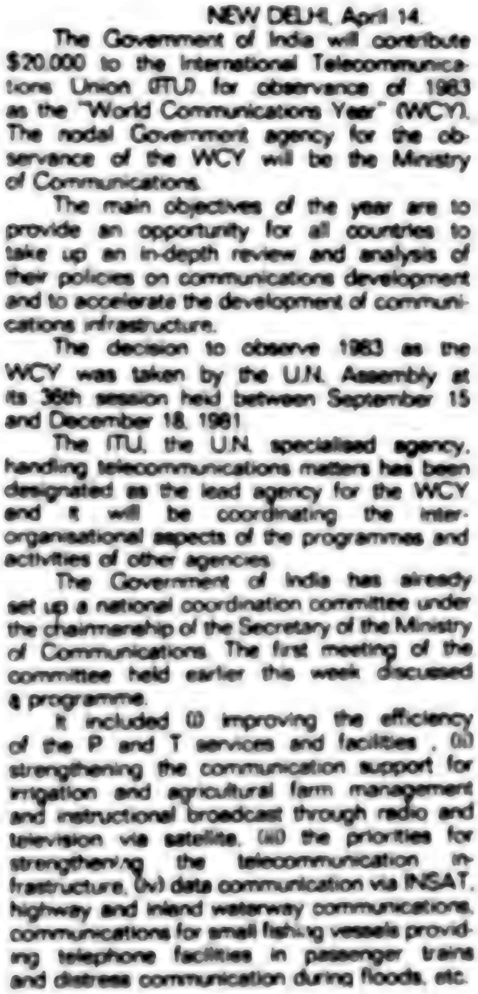
If acceptance of the French offer under a bilateral economic cooperation arrangement will better serve the larger national interests, the Government may do just that.

CSO: 5500/7117

CONTRIBUTION TO ITU FOR COMMUNICATIONS YEAR PLANNED

Madras THE HINDU in English 15 Apr 82 p 6

[Text]



NEW DELHI, April 14.

The Government of India will contribute $20,000 to the International Telecommunications Union (ITU) for observance of 1983 as the "World Communications Year" (WCY). The nodal Government agency for the observance of the WCY will be the Ministry of Communications.

The main objectives of the year are to provide an opportunity for all countries to take up an in-depth review and analysis of their policies on communications development and to accelerate the development of communications infrastructure.

The decision to observe 1983 as the WCY was taken by the U.N. Assembly at its 36th session held between September 15 and December 18, 1981.

The ITU, the U.N. specialised agency, handling telecommunications matters has been designated as the lead agency for the WCY and it will be coordinating the inter-organisational aspects of the programmes and activities of other agencies.

The Government of India has already set up a national coordination committee under the chairmanship of the Secretary of the Ministry of Communications. The first meeting of the committee held earlier this week discussed a programme.

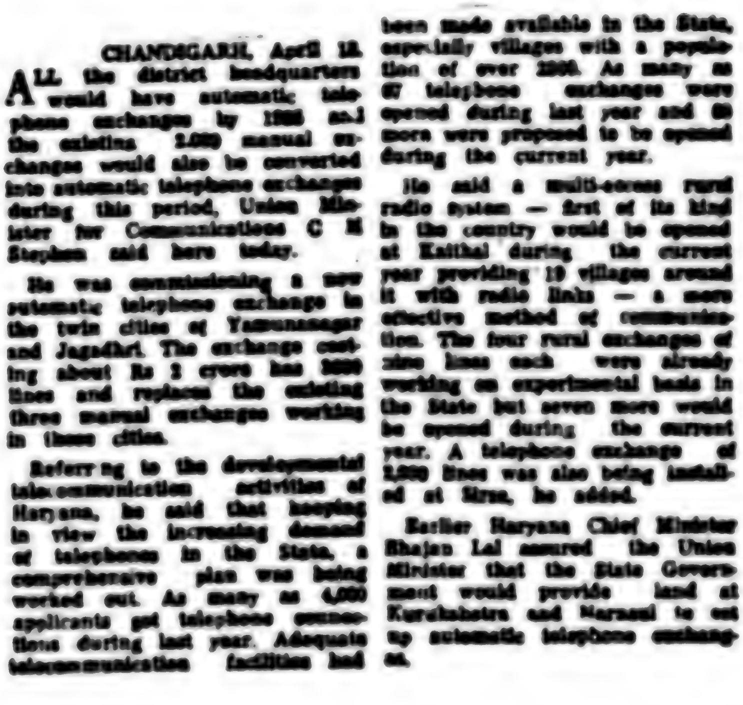
It included (i) improving the efficiency of the P and T services and facilities , (ii) strengthening the communication support for irrigation and agricultural farm management and instructional broadcast through radio and television via satellite, (iii) the priorities for strengthening the telecommunication infrastructure, (iv) data communication via INSAT, highway and inland waterway communications, communications for small fishing vessels providing telephone facilities in passenger trains and distress communication during floods, etc.

CSO: 5500/7120

AUTOMATIC EXCHANGES FOR ALL DISTRICTS BY 1985

New Delhi PATRIOT in English 19 Apr 82 p 9

[Text]



CHANDIGARH, April 18.

ALL the district headquarters would have automatic telephone exchanges by 1985 and the existing 2,000 manual exchanges would also be converted into automatic telephone exchanges during this period, Union Minister for Communications C M Stephen said here today.

He was commissioning a new automatic telephone exchange in the twin cities of Yamunanagar and Jagadhri. The exchange costing about Rs 2 crore has 3000 lines and replaces the existing three manual exchanges working in these cities.

Referring to the developmental telecommunication activities of Haryana, he said that keeping in view the increasing demand of telephones in the State, a comprehensive plan was being worked out. As many as 4,000 applicants got telephone connections during last year. Adequate telecommunication facilities had been made available in the State, especially villages with a population of over 2000. As many as 67 telephone exchanges were opened during last year and 80 more were proposed to be opened during the current year.

He said a multi-access rural radio system — first of its kind in the country would be opened at Kaithal during the current year providing 19 villages around it with radio links — a more effective method of communication. The four rural exchanges of nine lines each were already working on experimental basis in the State but seven more would be opened during the current year. A telephone exchange of 2,000 lines was also being installed at Sirsa, he added.

Earlier Haryana Chief Minister Bhajan Lal assured the Union Minister that the State Government would provide land at Kurukshetra and Narnaul to set up automatic telephone exchanges.

CSO: 5500/7125

BRIEFS

NORWEGIAN PHONE EXCHANGES--Norway is going to supply five electronic rural telephone exchanges costing about Rs one crore to India under the Indo-Norwegian Technical Assistance Programme covered by the agreement on 1 January 1981 between the two governments. The five containerised metaconta rural exchanges, manufactured by Messrs STK of Norway are to be installed at Nainital (800 lines), Almora (400 lines), Ujhani (250 lines), Telecom Training Centre at Lucknow (64 lines) and at Advanced Level Telecommunication Training Centre, Ghaziabad (64 lines). In pursuance of the agreement, a plan of operation was signed in the Capital on Friday by P and T Board Director N.S. Ramchandran and Norwegian Embassy Councillor Vidkunn Isaken. [Text] [New Delhi PATRIOT in English 17 Apr 82 p 5]

CSO: 5500/7123

BRIEFS

TELEX EXCHANGE EQUIPMENT ARRIVES--Kathmandu, April 18--Telex exchange equipment weighing to 22 tons arrived here yesterday for installation at the new international telecommunications building nearing completion at Tripureshwar, reports RSS. This was the third and last consignment of telecommunications equipment to be flown by DC 10 freighter aircraft into Kathmandu. The previous two were for the new earth satellite communication station being built at Balambu. The combined earth station and telex exchange station both part of the British development programme, will enable telex subscribers to connect themselves automatically to any part of the world via the Indian Ocean satellite, Intelsat V. [Kathmandu THE RISING NEPAL in English 19 Apr 82 p 1]

CSO: 5500/5777

OBJECTIONS RAISED ON INTEGRATED NATIONAL TELECOMMUNICATIONS SYSTEM

Manila BULLETIN TODAY in English 19 Apr 82 p 26

[Text]

The Philippine chamber of communications voiced out strong objections over the weekend to the single integrated national backbone for voice, telegraph and telex recently ordered by Transportation and Communication Minister Jose P. Dans, Jr.

The ministry circular stated, among other things, that the integrated national backbone shall be capable of handling both voice and data traffic at a speed of at least 64 kilo bits per second (KBPS) for data transmission, including signalling.

It also stated that the use of voice (any type) outside of the Philippine Long Distance Telephone Co., the enfranchised voice carrier, shall not be authorized.

The record communications sector, PCCI said, was particularly opposed to the concept of a single integrated backbone system.

The association said in a position paper presented to Dans that the circular was a contradiction, or a misinterpretation in the least, of certain government orders.

PCCI said one homogeneous national telecom network prescribed by the approved 5-year development plan did not necessarily mean one backbone.

To interconnect, PCCI members said, means to integrate facilities but not to have one backbone for both voice and data. They said effective integration allows interconnection of two or more backbones.

Citing the Western Union experience of living in a dependency on the facilities of the telephone carriers which, they said, is a lesson to be learned and avoided — PCCI was objecting to placing record communications in a secondary and dependent position to the telephone industry.

PCCI foresees the predicament where the record communications industry could not expect the proper response and support of PLDT who is already burdened with its own service problems.

CSO: 5500/5781

COMMUNICATIONS INFRASTRUCTURE WITH EUROPE, U.S. SET BY 1990

Rio de Janeiro O GLOBO in Portuguese 21 Mar 82 p 34

[Text] With the opening of the Atlantis undersea cable, as of August of this year, Brazil will be taken care of until 1990 by a satisfactory communications infrastructure with Europe and the United States. Then the Brazilian Telecommunications Company (EMBRATEL) will go with the third-generation cables, the great innovation of which will be the possibility of transmitting perfect TV pictures from one continent to another through glass fiber optic conductors.

It is possible that the new cables will be available in 1985 with a much greater transmission capacity than that of the coaxial cables currently in use. When the latter emerged in 1943 they made it possible to transmit telephone calls and telex signals, initiating a technological revolution that carried mankind far from the time when undersea cables were utilized only for telegraphic communications. Also further and further removed is the time of piracy, when fishermen dived into the sea in search of copper of which the conductors of the first cables were made to sell it as scrap metal.

Old Cables

Ten of those old cables started from Recife alone, the capital of Pernambuco, having been installed mainly by the Western and Brazilian Telegraph Company. Beginning in 1883, after the first concession given by Emperor Dom Pedro II--who heeded a suggestion in that regard by the Baron of Maua--Brazil became linked to Madeira Island, Maldonado (Argentina) and Miami, in the United States. In addition, dozens of other cables permitted telegraphic communications between Belem and Manaus (through the Amazon River). Belem to Recife, Recife and Rio de Janeiro, Rio de Janeiro and Vitoria, Salvador and Rio de Janeiro, Recife and Sao Luis, Rio de Janeiro and Santos, Natal and Florianopolis, and Santos and Chi.

The old cables had copper conductors 1 centimeter in diameter. Therefore, a few meters of those cables weighed a lot when sold as scrap metal. With their deactivation, it became more economical for the companies that operated them to abandon them on the bottom of the sea than to have them removed.

The acts of piracy then increased, with fishermen being aided by the nautical charts that indicated the location of the cables. It is probable that none of the old telegraph cables are left; all of them have already been transformed into scrap.

Second Generation

At the present time, communications abroad by cable are made via the Brus [cable], which goes from Fortaleaz, to the U.S. Virgin Islands a distance of 2,256 nautical miles (one nautical mile equals 1,853 meters); and via the Bracan-I, which goes from Recife to the Canary Islands, Spain, covering a distance of 2,630 miles. The Brus was put into operation in 1980, and has 640 equivalent voice channels; that is, it permits the simultaneous transmission of 640 communications. Bracan-I has 16 channels.

Both belong to the second generation of cables, the coaxial cables, like the Atlantis that is being installed between Recife and Dakar in Senegal, and from there to Lagos, in southern Portugal. The Atlantis will be the most powerful of all, with 1,800 equivalent voice channels, and it will cover a total distance of 3,450 nautical miles (1,750 between Recife and Dakar, and 1,700 until Lagos). Brazil associated itself with nine other countries to install it--Argentina, Senegal, Ivory Coast, Portugal, Italy, Germany, Switzerland, France and England--and is the largest stockholder in the consortium. The Brazilian share is 28.6 percent of a total expenditure of $200 million.

Atlantis

The installation of the Atlantis cable began in October 1981. The Recife-Dakar section is ready and the work on the second section is nearing Portugal, with the cableship laying 40 miles of cable per day in the bottom of the ocean.

A cableship is a vessel built especially to lay and repair undersea cables. They belong to the large companies that operate communications systems of that type: the American Telephone and Telegraph (AT&T) of the United States; the British Telecommunication International, of England; and the Administration Francais de Postes et Telecommunications, for example. AT&T is also the owner of the largest such ship currently in operation, the "Long Lines," 511 feet (177 meters) long.

Installation

The ships have special tanks to transport cables and all the apparatus to lay them in the bottom of the sea. Tractors especially made to bury the cables in the seashore and bathymeters that follow the descent of the telecommunications equipment to the bottom of the sea are some of that special equipment. They will soon also be equipped with minisubmarines that will facilitate keeping up with and even expediting the installation work.

The vessels are contracted by the cable makers for the installation and by the consortiums of countries that operate the cables for maintenance service. Only four companies in the whole world are engaged in making cables: Standard Telephones and Cables, of England; Les Cables de Lyon, of France; Simplex, of the United States, and Ocean Cables, of Japan. Being installed at the present time, in addition to the Atlantis cable, are the Atlas, linking Portugal and Morocco, and the Anzcan, between the west coast of Canada and Australia.

Risks Are Great Near the Coast

The contract of the cableships for laying operations ends as soon as the cable goes into operation. But that is not the case with maintenance: the consortiums of operating countries keep the ships they need for the repairs that are necessary periodically under permanent contract. Brazil is included in the agreement for maintenance of the cables in operation in the Atlantic: the Atlantic Cable Maintenance Agreement (ACMA), comprising 14 countries. The ACMA has five ships at its disposal which remain on duty at strategic ports in the region (Canada, the United States, England, Spain and France). Fifty undersea cables are being now operated in the Atlantic region.

The greatest risks are external ones. From the technological viewpoint, the only defect a cable develops is at the repeaters installed every 5 miles. In case of a defect or accident, the control stations locate the section affected in less than an hour with the aid of computers. Various tests are then conducted to identify the type of damage and establish what emergency plan will be utilized. The cable ships are called only when complete information about the damage is available because they have to leave the support port with all of the equipment and parts the repair will require.

Brazil is taken care of by the cableship "Mercury," which stays anchored in the port of Vigo, in Spain. When the damage occurred to the Bracan-I cable in September 1980, the ship required only 2 days to make the repairs.

Contracting the cableships for maintenance services costs ACMA $16,000 per day each. In case it is activated for repairs, that cost increases 30 percent. The costs are established in terms of the length of the cable and its position in relation to the port where the ship remains anchored. In the case of Brazil, its annual contribution to ACMA varies between $200,000 and $250,000.

The maximum diameter for an undersea cable is 10 centimeters, but that occurs when it is near the coast because of the greater protection that the conductors need--actually layers only 1 millimeter thick separated by insulating areas made of polyethylene. The external protection is made of jute and pitch. The useful life of coaxial cables is approximately 25 years. In general, that type of cable begins to develop defects at the repeaters after 10 years of use.

This technology began to be developed in 1943 and the first cable with transatlantic characteristics was installed in 1956, linking the United

States and England, and having 23 equivalent voice channels. Telephone, telegraph and telecommunications connections are established by means of the cables. There is also the possibility of transmitting TV pictures but only for distances under 700 kilometers (Japan uses coaxial cable for that purpose).

But the great revolution in this regard will occur after the installation of the first glass fiber optic conductor cables, which will be able to contain up to 12,000 equivalent voice channels. It will be precisely the greater capability that will permit the transmission of pictures because that requires the simultaneous use of 900 channels. That way, an alternative to transmissions via satellite will be established, granting that the costs will be equivalent.

8711
CSO: 5400/2127

BRIEFS

SATELLITE REPORT DELAY--Brasilia--The Communications Ministry extended until 5 April the period for submitting the final report that will name the winner of the bidding to supply the Brazilian domestic satellite. Ministry sources asserted yesterday that there is no impasse in the selection of the winner, stressing that selection of the bids is taking into priority account the counterpart imports which the two consortiums presented, the price, the time period, the financing of the satellite and the transfer of technology. On 15 January, when the Canadian Spar and the French Aerospaciale consortiums presented their definitive bids to the Communications Ministry, it was determined that the ministry would present its decision in 60 days. However, the committee charged with analyzing the bids has not concluded its work and yesterday asked Communications Minister Haroldo de Mattos for an extension of time. Ministry experts have avoided talking about the bids being studied but it is known that both the French and Canadians presented a price that is considered quite high for the installation of the satellite, the space segment, the ground stations and the launching, in the neighborhood of $200 million. Technically, both plans are considered excellent. [Sao Paulo O ESTADO DE SAO PAULO in Portuguese 20 Mar 82 p 10] 8711

MICROWAVE STATIONS IN RONDONIA--Porto Velho--By August 1982, the entire section between Porto Velho and Cuiaba, approximately 1,500 kilometers, will be served by the line-of-sight microwave trunk-link, with repeater stations every 40 kilometers, at an investment of approximately 3.7 billion cruzeiros, (in December 1981 prices), according to the announcement of engineer Wilson Luiz Cardoso, chief of the Brazilian Telecommunications Company (EMBRATEL) operations district in Porto Velho. Yesterday part of that section was put into operation between the capital of Rondonia and Ji-Parana, covering the intermediate municipalities of Ariquemes, Jaru and Ouro Preto, for a total of eight repeater stations, making possible the direct reception of television pictures in the four municipalities and also increasing from 180 to 1,800 the intercity voice channels. That number can still be tripled, which should guarantee the flow of telephone traffic in Rondonia until the year 2010. According to engineer Wilson Cardoso, as a result of this, another city in Rondonia has its direct dialing system in operation--the municipal seat of Cacoal, 450 kilometers from Porto Velho--in addition to enabling the Rondonia Telephone Company (TELRON) to activate 2,000 new telephone terminals in Ji-Parana. [Sao Paulo O ESTADO DE SAO PAULO in Portuguese 17 Feb 82 p 12] 8711

POSSIBLE DIGIBRAS SALE TO HUNGARY--Brasilia--Hungary may become the first socialist country to purchase high technology Brazilian equipment in the area of data processing, including electronic and electroacoustic components, telephone equipment, copying machines and data processing ancillary equipment. According to the Brazilian Data Processing Corporation (DIGIBRAS), those products would be included in the new bilateral cooperation agreement to be signed with Hungary during the visit of Hungarian Vice Minister, Otto Herckner, to Brazil next week. Herckner is going to meet on Tuesday with the president of DIGIBRAS, Ambassador Paulo Cotrim. [Rio de Janeiro O GLOBO in Portuguese 27 Mar 82 p 24] 8711

CSO: 5400/2127

BRIEFS

NEW TELEVISION RELAY--According to a Central News Unit report, thanks to collaboration between the staff of the technical repair and maintenance unit of the Voice and Vision of the Islamic Republic of Iran in Mashhad center and the group engaged in extending the television network of the Voice and Vision of the Islamic Republic of Iran, the 'Aliak television relay system was set up on 9 April this year and officially started work as of 29 April. The relay system transmits the first programs of the Vision of the Islamic Republic of Iran on Channel No 7 with a power of 10 watts and brought the 'Aliak, Moshkan, Soltanabad, Robat-e Jaz (Borqabant), Chahak and (Anbarestan) regions between Heyshabur and Savsevar under the coverage of the Vision of the Islamic Republic of Iran. [Text] [Tehran Domestic Service in Persian 1630 GMT 29 Apr 82 LD]

CSO: 5500/2217

BRIEFS

'PANA' MEETING SCHEDULED--Harare--A meeting on the launching and operation of the Pan African News Agency (Pana) in Southern Africa would be held in Lusaka in June, the deputy editor-in-chief of the Zambian News Agency (Zana), Mr David Kashweka, said in Harare yesterday. He returned to Zambia yesterday after a three-day visit to Zimbabwe to hold discussions with officials of the Zimbabwe Inter-Africa News Agency (Ziana) before Pana's launching, scheduled for early next year. Ziana, Zimbabwe's semi-official news agency, reported that Mr Kashweka had also come to guage whether Zimbabwe's telecommunications links would be able to cope with Pana traffic. He told Ziana that Zimbabwe was one of six countries he had visited which would form part of Pana's Southern African region. The others were Malawi, Mozambique, Botswana, Lesotho and Swaziland. Pana's headquarters would be in Lusaka. From what he had seen, Mr Kashweka said, there would be "no problem" with information traffic between Harare and Lusaka or the other countries in the region with the exception of Lesotho. The present state of telecommunications facilities in Lesotho meant information had to be passed through South Africa. Regional meetings of Pana member states were being held in preparation for a joint meeting in Dakar, Senegal, at the end of June where the results would be studied. While in Zimbabwe, Mr Kashweka also discussed a "bilateral working relationship" between Zana and Ziana.--Sapa [Text] [Johannesburg THE CITIZEN in English 1 May 82 p 10]

CSO: 5500/5779

BRIEFS

LUANDA-BENGUELA TELEPHONE LINE--The National Telecommunications Company (ENATEL) has inaugurated an automatic telephone service between Luanda and Benguela. The number to dial to call Benguela from Luanda is 0099, followed by the desired number, and the number to call Luanda from Benguela is 0097, with the same number used for calls from Lobito to Luanda. [Excerpt] [Luanda JORNAL DE ANGOLA in Portuguese 21 Apr 82 p 4]

CSO: 5500/5774

BRIEFS

RESUMPTION OF TELECOMMUNICATIONS--Asmara (ENA)--The post office and telecommunications building which was wantonly destroyed by secessionist bandits in the town of Keren was put to service yesterday following reconstruction work at a cost of 30,000 Birr. Repair of the building was part of the overall project in Eritrea region of the Red Star Multi-Faceted Revolutionary Campaign. Comrade Yusuf Ahmed, Minister of Transport and Communications and COPWE Central Committee member, who presided over the reopening ceremony of the repaired post and telecommunications building in Keren acknowledged the active involvement of members of the revolutionary army in the reconstruction work. The Minister noted that bandits not only destroyed functioning public facilities but had also blocked planned development projects in the region. He disclosed that preparations have been finalized to launch improved communication network in Keren province. Comrade Yusuf said that the organization of the peasantry and the urban masses has greatly facilitated postal services in Ethiopia which he described as exemplary in Africa. He said that microwave and other telecommunications links are also planned for Keren province in line with the recommendations of the Second Plenary Meeting of COPWE Central Committee. [Excerpt] [Addis Ababa THE ETHIOPIAN HERALD in English 23 Apr 82 p 1]

CSO: 5500/5780

BRIEFS

AMPLIFICATION OF RADIO SIGNALS--Moscow, 3 Apr, TASS--The reliability of radio and telephone communications has been considerably improved of late in the Dzhambul Region, Kazakhstan, writes MN [Moscow News] Information. The vast distances between the republic's relay stations result in signal attenuation and high noise levels. The Institute of Physics and Mathematics has therefore devised an original system, which, not unlike a concave mirror, focuses radio rays, amplifying and directing them towards relay stations. The new system, called a phase correcting reflector, increases the power of a signal fourfold without consuming any additional energy. Such passive reflectors are especially valuable for mountainous areas, where hills hinder communications in the centimetre wavelength band. They require no maintenance and can be installed practically anywhere. [Text] [Mosocw TASS in English 0614 GMT 3 Apr 82 LD]

CSO: 5500/2217

CP MINISTER'S BAN OF UK SATELLITE TV STIRS OUTCRY

Paper Concerned Over Wahlstrom's Ruling

Helsinki HELSINGIN SANOMAT in Finnish 14 Apr 82 p 2

[Editorial: "Fear of Satellite Exeeded Ability to Evaluate"]

[Text] The Communications Ministry has prohibited the Postal and Telecommunications Administration from conducting a test reception of satellite transmissions in Helsinki. The postal administration which transmitted test programs to Helsinki Television's cable network, was criticized for the fact that it had infringed on the state-owned Finnish Broadcasting Corporation's carefully guarded area of jurisdiction. According to Communicatons Minister Jarmo Wahlstrom the joint experiment was not well thought-out since legislation concerning cable television operations has not yet been enacted.

The Communications Ministry's determination that the technical experiment should be stopped is surprising and lacking any understandable justification. In practice it means that the Postal and Telecommunications Administration is prohibited from studying and exploiting new means of communication in a manner that serves the people. This determination is in complete contradiction with the objective that technically and economically the best possible results in the transmission of information between countries is expected of the Postal and Telecommunications Administration. This objective cannot be accomplished if the postal service is only given the authority to carry letters.

With its decision the ministry has placed telecommunications administration officials responsible for technical experiments in a regrettable situation. There is good reason to ask what circumstances give the ministry the right to interfere in normal technical experiments, whose goal is to develop international communications and services to society.

On the other hand, the political background of the ministry's decision is clear and "expedient". Satellites are the future means of communication, which will considerably expand the possibilities of television services, among other things. At that time people will have an opportunity in principle to follow programs transmitted directly from other countries. For example, the monopoly position of the Finnish Broadcasting Corporation would no longer be complete in the area of ethereal communications.

In Finland international competition is feared by the Finnish Broadcasting Corporation, at whose apparent initiative the Communications Ministry has now prohibited satellite experiments. Indeed, Minister Wahlstrom has his own ideological reasons for this ban since the internationalization and liberalization of the transmission of information does not serve the centralized communications model promoted by the Communists. The Communists and the People's Democrats have persistently opposed the joint Nordic satellite project, among other things, fearing that the control and supervision of officials will be reduced.

It is an exaggeration of self-defense when a technical experiment is prohibited in the preparatory phase of legislation concerning cable television. It should actually be of assistance in deliberating legislative policy. It has even become apparent from the radio and television committee's parliamentary bill concerning cable transmissions that it will only provide a basis for a broader clarification of the issue since as such it represented a rather narrow view connected with the interests of the Finnish Broadcasting Corporation.

Conservatives' Chairman Charges 'Censorship'

Helsinki HELSINGIN SANOMAT in Finnish 15 Apr 82 p 10

[Article: "Suominen Criticized Ministry: Ban on Satellite Experiment Is Censorship"]

[Text] Conservative Party Chairman Ilkka Suominen considers the Communications Ministry's interference in satellite transmissions to be an astonishing censorship measure.

The Communications Ministry has prohibited the Postal and Telecommunications Administration from conducting an experiment on the reception of satellite transmissions in Helsinki. Since the end of March the postal service has transmitted test programs originating in England to Helsinki Television's cable network.

The arguments by which participation in this experiment is prohibited are completely foreign to the concept of freedom of speech in a democratic society and have more to do with the ideological premises of the individual who proposed the ban, stated Suominen in Lohja on Wednesday.

According to Communications Minister Jarmo Wahlstrom (Communist), who is behind the ban on this experiment, the joint experiment of the postal service and Helsinki Television was not well thought-out since legislation concerning cable television operations has not yet been enacted.

Even though a bill is presently being prepared with respect to cable operations, this cannot be a justification for prohibiting satellite transmissions, stated Suominen. "In this instance we have now embarked upon a path according to which a state institution should always refrain from acquiring any kind of additional information and conducting experiments," continued the chairman of the Conservative Party.

Suominen urged the government's bourgeois parties to become involved in the restrictive attempts of the Ministry of Communications.

Firm Vows to Continue Transmissions

Helsinki HELSINGIN SANOMAT in Finnish 16 Apr 82 p 10

[Article: "Orbit of TV-Satellite Adjusted, Ban Will Not Stop Transmissions"]

[Text] The intent is to continue the television satellite broadcasts transmitted by Helsinki Television in spite of the negative stand of the Ministry of Communications. Communications Minister Jarmo Wahlstrom (Communist) prohibited the Postal and Telecommunications Administration from receiving satellite transmissions for Helsinki Television just before Easter.

Helsinki Television's satellite transmissions have been discontinued since last Friday. This is a result of the fact that the orbit of the OTS-satellite used for transmissions was adjusted 5 degrees over Easter.

"We will resume test transmissions on 20 April and the intent is to begin actual satellite programs on 26 April when programming broadcast by the English corporation will be 2 hours daily," assures Helsinki Television's Managin Director Heikki Saraste.

Helsinki Television's satellite programs are received by a 5-meter disc antenna leased from the Postal and Telecommunications Administration. However, on last Thursday the Ministry of Communications demanded that the postal service discontinue the satellite transmissions.

"We have an agreement with the Postal and Telecommunications Administration, the essence of which is that transmissions will continue as long as the present OTS-satellite remains operational or 1--2 years," states Managing Director Saraste.

Satisfied With Satellite Programming

According to Saraste viewers have been exceptionally satisfied with the sattellite programming. "There seems to be a real demand for English-language programming."

The Postal and Telecommunications Administration has not for the time being had time to take a stand on the ministry's ban. "We did not receive the letter from the ministry until Wednesday. I have assigned the task of finding various alternatives for resolving this issue, but immediate decisions must not be expected," states Director Pekka Tarjanne.

There is a 3-month period in which notice of cancellation can be given, and now it must be determined whether the agreement can be rescinded without having to pay any compensation to Helsinki Television.

"There is no mention of how an agreement would be rescinded in practice in the letter sent to the Postal and Teleccommunications Administration by the ministry. A decision was made to prohibit the satellite experiment for the reason that funds had not been allocated for it," states administrator Kai Tornblom of the Ministry of Communications.

Funds were requested for the satellite television experiment from allocations for the planning of a coastline channel. However, the ministry announced that the funds are to be used for improving Swedish-language programs in the coastal area.

Cable Television Law Needed First

In the opinion of Communications Minister Jarmo Wahlstrom it is not suitable to begin new forms of cable television at the same time that a new cable television law is being prepared.

Minister Wahlstrom disputes the fact that the initiative to suspend satellite television transmissions came from the Finnish Broadcasting Corporation. "Naturally, as a member of the advisory board of the Finnish Broadcasting Corporation I am familiar with the various points of view. The Finnish Broadcasting Corporation naturally opposes private cable television operations," states Minister Wahlstrom.

Resentment With Comparison to Operations of Finnish Broadcasting Corporation

The cable television report has encountered surprisingly stiff opposition. The report unanimously approved by the cable and television committee does not satisfy all those expressing an opinion, but except for two all the statements demand a revision of the bill.

The strongest resentment is expressed with respect to the comparison of cable television operations with those of the Finnish Broadcasting Corporation. Also the demand to include Finnish-language programming and the strict restrictions on advertising irritate those issuing statements.

According to the critics the radio and television committee has acted in accordance with the interests of the Finnish Broadcasting Corporation: the experts used are from the Finnish Broadcasting Corporation, the committee is crawling with members of the Finnish Broadcasting Corporation's advisory board, and the other politicians included in it have been persuaded to go along with the opinions of those members linked to the Finnish Broadcasting Corporation.

According to Kai Tornblom it seems quite exceptional that a report which has been subjected to a thorough parliamentary dicussion is criticized so severely. "However, what can be done when everyone in the committee was unanimous from the Communists to the Christians," states Tornblom in amazement.

Bill Will Be Ready in the Fall

According to Tornblom the discussion of the bill will in any event have to be conducted on the basis of the committee's proposal. The planning and enactment of the bill is further slowed down by the fact that the Ministry of Justice and the Interior Ministry have not yet made their own statements.

Tornblom promises that the bill will be ready by late summer at the latest when the government returns from its summer break. "The bill will be ready for the fall session of parliament."

The Communications Ministry received 16 statements on the radio and television committee's cable report. The majority of those issuing statements considers that cable television operations should be covered by legislation. Only the Cable Television League questions the necessity of the law in its entirety. According to the league cable television operations do not need special legislation.

The radio and television committee based its proposal on the fact that cable television operations are more similar to the operations of the Finnish Broadcasting Corporation than the press.

Principle of Press As Premise

The majority of those issuing statements considers that the committee made a basic error in the seletion of its premise. This activity is generally considered to be so close to the operational principles of the press that the premise should be a principle based on the model of the press.

The committee's view best serves the Finnish Broadcasting Corporation and the League of Journalists. On the other hand, the League of Periodicals, the League of Newspapers, the Marketing League, the League of Advertising Agencies, the Central Chamber of Commerce, and the Municipal League consider that cable television operations should be seen as more a part of the press than operations of the Finnish Broadcasting Corporation.

In appealing to national culture the committee demanded that 40 percent of cable television programming should be of domestic origin. Many of those making statements considered this demand to be completely unreasonable.

Also the committee's proposal that advertising can amount to only 7.5 percent of programming time at the most received considerable opposition.

Liberal Party Worried Over 'Freedom of Expresssion'

Helsinki HELSINGIN SANOMAT in Finnish 18 Apr 82 p 11

[Article: "Liberals Concerned About Freedom of Speech"]

[Text] The Liberal Peoples Party considers that the attempt of officials to prevent the experimental operation of cable television limits freedom of speech.

In the opinion of the party's executive council the attempts to alter the conditions of cancellation with respect to an agreement in a manner different than what was agreed upon between an employer and employee regardless of whether they exercised their right to join a labor market organization or not also demonstrated an alarming development to restrict basic civil rights.

The Liberal Peoples Party presuppoes that the government will revise the proposal made with respect to job security and conditions in such a way that the equality of the parties involved in working conditions will be guaranteed and unjustified cancellations of contracts will be effectively prevented. The party also urges the immediate extensive reform of basic rights.

Minister Wahlstrom Defends Stand

Helsinki HELSINGIN SANOMAT in Finnish 18 Apr 82 p 10

[Article: "TV Satellite Will Not Bring Additional Freedom of Speech"]

[Text] In the opinion of Communications Minister Jarmo Wahlstrom (Communist) what is most disheartening in the recent discussion on the tv satellite experiment has been that the defenders of this experiment have been hiding under the guise of protecting the freedom of speech.

In slightly scratching the surface it becomes apparent that the larger newspapers have built or are building their own cable television networks in the larger cities.

"This it is not a question of any individual's freedom of expression, but the freedom of the large newspapers to procure additional profits for their owners by means of new technology," states Wahlstrom.

According to him what is ironic in this is that in the United States, from where the rightwing readily accepts models, legislation has been enacted to prevent the establishment of just this kind of information monopoly which is now beginning to come into existence in Helsinki and is being formed in Turku and Tampere, for example.

In these areas the major newspapers are merely supporting their own economic and political interests and not the freedom of speech of individual citizens."

Wahlstrom points out that the parliamentary committee which reported on cable television operations was in principle completely unanimous with respect to the report on this matter. "It is natural that limits, which any nation finds to be reasonable, are placed on activities requiring large investments in which the individual has no opportunities. This is not at all a question of censorship."

In his opinion the new developments in mass communications will threaten our national identity and its individual traits if it is allowed to grow free and wild.

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ARIANESPACE, AMERICAN SHUTTLE COMPETE ECONOMICALLY, TECHNICALLY

Paris AVIATION MAGAZINE INTERNATIONAL in French 1-14 Mar 82 pp 30-31

[Article by Jacques Tiziou: "Are Ariane and the Shuttle Competitive?]

> [Text] Ariane completed 1981 with a dual victory, although the successful development of the L-04, which ended the launcher's experimental stage, may not be the most important aspect. Successes with Western Union, Southern Pacific and General Telephone and Electronics are probably much more significant. In short, almost everywhere there is an increasing tendency to speak of competition between Ariane and the shuttle. Exactly what does this mean? Jacques Tiziou, our regular correspondent in Washington, explains ....

The successes which we have just mentioned support the choice of the European rocket for the launching of 5 satellites: 1 Westar, 2 Spacenets and 2 G-Stars, for American telecommunications giants. The American press, which has practically never mentioned Ariane, with the exception of specialized journals, has finally woke up, as have financial circles, which consider the three companies' decision to call on Europe to launch their satellites as an outright loss of $125 to $135 million for American space operations.

Some people say that the corporations have quietly dropped their country and the space program which American taxpayers have financed, and just when U.S. launching facilities could be rendered profitable to a good extent. They compare this attitude to that of motorists who choose to purchase small Japanese cars when Detroit is going bankrupt.

Meeting Needs

American telecommunications "giants" reply that they are going through a period of keener competition, that they must be able to offer their customers the best prices and, therefore, be able themselves to take advantage of the best prices. They say that Ariane costs just under $20 million per satellite (for a double launching), or 20 percent less than the Delta rocket.

Yes, the Delta! They don't even mention the space shuttle, since all of the 72 operational launchings scheduled between November of this year and September 1987 have already been reserved. There are still options in some cases, but as long as an option has not been withdrawn, NASA can hardly release the tiniest space.

These 72 launchings within 5 years should make it possible to put into orbit about 100 payloads, ranging from small telecommunications satellites weighing about 1 ton to Spacelab-type laboratories, not to mention a multitude of small "get-away specials" weighing several tens or hundreds of kilograms. It is impossible to tell the exact number of satellites that will be launched during this period, since some missions will be entirely military and also since the Pentagon has been careful not to specify whether 1 or 10 satellites will be put into orbit during a particular mission.

The American space agency has long known that the shuttle bays would be quickly filled, even though they are almost large enough to hold an Ariane first stage (nearly 40 cm in size) and even though the orbitable mass is 30 tons for each flight, or 35 tons after all improvements have been made, which is 5 times more than the Ariane 4. This does not mean that it will be possible to launch 5 satellites in a geostationary orbit from the bay of the shuttle. Because of the upper stages, space is still limited and the maximum number will be four. And such a mission will not take place before the STS-29 mission which Columbia must make in June 1985. This will be a 5-day mission with a 4-man crew and should make it possible to launch Telstar 3-D, RCA-H, G-Star C and Syncom IV-3 satellites.

Competitive in Some Cases

Most of the time, the shuttles will carry only 2 satellites to be put into a geostationary orbit, or sometimes 3, and from this standpoint it can definitely be said that the space shuttle will be in competition with the European rocket. Such competition is welcome, according to NASA, where they know too well that budgetary sources will dry up without competition. But is it really possible to speak of competition, they ask us, since we can hardly accept any new customers between now and 1988 and since we have been obliged to step up the production of Centaur and especially Delta rockets in order to meet future needs, particularly with regard to this dramatic increase in telecommunications satellites.

McDonnell-Douglas says that Delta costs what it costs and does not receive U.S. Government subsidies. "Of course we lose money every time that Ariane obtains a customer. But we don't have the means to combat commercial practices at the government level. We can only exploit our launcher's 22-year history, its 93-percent reliability since 1960 and 96 percent since 1975, and point out that this is based on 160 launchings."

Ariane's other competitor is the Atlas-Centaur rocket manufactured by General Dynamics. It has also been affected by the impact of the European rocket, which will provide one-half of the launchings of Intelsat V satellites. But from NASA's viewpoint, it is also only an alternative solution, from the standpoint of demand, until 4 shuttles are in service and 2 missions are possible every month in 1988 (there will be 17 in 1986 and 17 in 1987) and until it is finally possible to satisfy such demand.

Doubled Prices?

There is still the problem of determining the price. Between now and 1986, a "customer" can have a satellite launched by the shuttle for "only" about $10 million. But NASA will soon have to adjust its rates and no one will be surprised if these rates double. Promotional rates are not forever and this will perhaps be the case as well for Ariane between now and when it is put into service, in early 1986 at the soonest.

But shuttle officials, at least officially, display hardly any concern, saying often that they do not consider the problem of competition between Ariane and the shuttle to be real, rather that it is a European invention; they even point out that Ariane is coming to their aid, since they cannot meet the demand, and that the shuttle is a multipurpose vehicle, a vehicle that is piloted and reusable from one launching to the next, a device which is not only capable of placing a 30-ton spy satellite or components of permanent orbiting space stations into orbit, but also of repairing damaged satellites in orbit, and especially bringing them back to earth so that they can be restored to proper working condition and relaunched, which will be the case of the SMM [expansion unknown] by late 1983.

In the longer term, also according to shuttle program officials, telecommunications satellites will no longer weigh 3 tons but 10 and the shuttle will not need to grow. Malicious gossips (they also exist in the United States) add that by the end of the decade, Ariane will have finished growing while the shuttle will only be reaching its puberty. Such gossips also state that only what is comparable should be compared and that Jacks of all trades cannot be compared with ultraskilled workers.

But this is an American version of the situation. This attitude does not prevent NASA and the U.S. Air Force from seriously considering the development of pilotless launchers derived from the shuttle's powder boosters, as powerful as the shuttle but less expensive than Ariane, in terms of the price of putting 1 kilogram into orbit. More than a question of big money, it is a matter of honor and principle. The Americans have difficulty acknowledging that equal or superior technology could come from abroad.

This is not yet true in the case of the space shuttle, but this was not the case either when the Japanese started to invade the U.S. automobile market. The situation could change greatly if management of the shuttle's operational flights were assigned to an industrial corporation, even more if assigned to a commercial corporation. NASA excels in research and testing, which has always been its mission. And the Office of Management and Budget, the OMB, will do well to learn a lesson from old Europe and encourage the creation of a kind of American Arianespace Corporation. That is when competition could really start.

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BRIEFS

ERICSSON SUPPLYING MOBILE-PHONE SYSTEM--SRA/Ericsson has been asked to construct a nationwide mobile-phone system in the Netherlands. The first phase of the order amounts to 50 million kronor, but that is for the base station alone. Construction of the system will follow, at which time the order will be greater. SRA/Ericsson, which is part of the Ericsson group, was chosen by the Dutch telecommunications authorities after competition with the Philips Co. of the Netherlands and Motorola of the United States. The order is for 45 base stations with a total of 670 channels and an AXE station. It is expected that the system will be expanded to 1,500 to 2,000 channels for a final capacity of 50,000 mobile units. When these 50,000 mobile units are constructed the order will become greater than 50 million. Marianne Laurell of SRA/Ericsson was asked if this would affect employment in Sweden. "Yes, in the long run it will," she said. "The units will be manufactured at our Kumla plant. In addition, this order is strategically important, since many telephone companies both in and outside Europe are planning or considering similar systems. [Text] [Stockholm SVENSKA DAGBLADET in Swedish 10 Apr 82 p 19] 9336

CSO: 5500/2202

BILL ON NORDIC SATELLITE SYSTEM APPEARS TO FIT TELE-X

Stockholm SVENSKA DAGBLADET in Swedish 4 Apr 82 p 7

[Article by Bjorn F. Hansen]

[Text] Education Minister Jan-Erik Wikstrom denied every request from Swedish Television with regard to the use of the Tele-X satellite.

This occurred in a proposal for Nordic cultural cooperation presented by him to parliament on Friday. In the TV portion of the satellite program, Tele-X and its successor, the permanent Nordsat satellite system, should be used exclusively for transmitting programs within the Nordic countries, according to the education minister.

According to the proposal, the Nordsat system would be changed so that it would be more and more like Tele-X. This latter satellite would be used, among other things, for data transmission and experiments. Its successor, the Nordsat system, would serve the same functions.

There can be no regular programing until both Tele-X and the first satellite in the permanent system are in space. Regular broadcasts, which are of interest to the public, cannot be expected before 1989.

Own Model

Swedish Television had hoped for a completely different model. One of the TV channels would be a joint Nordic channel. TV chief Sam Nilsson, along with his counterparts in Helsinki and Oslo, have begun discussions on how the channel should be used. Swedish Television wants to use the other channel itself, possibly for pay TV.

"Swedish Television has anticipated events. It seems to have decided on a model to follow, but without consulting our ministry or parliament," ministry secretary Bjarne Kirsebom said.

No New Production

According to Wikstrom's proposal Sweden, Finland, and Norway would have one satellite channel each. TV 1 and TV 2 would share the Swedish channel and regular programing would be transmitted to the neighboring countries. There would be no original programming for this channel.

The original Nordsat has been altered to such a degree that insiders believe its name should be changed. Perhaps "Nordkom" (Nordic Communications) would be a better name.

TV chief Sam Nilsson was not available for comment on Friday evening.

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CSO: 5500/2202

SWEDEN

MISSION, FUNCTION OF TELE-X SATELLITE DESCRIBED

Stockholm DAGENS NYHETER in Swedish 17 Apr 82 p 12

[Article by Roland Gyllander]

[Text] In several years when Sweden enters the space age with its own satellites, they will literally cover the earth. In spring 1984, a Viking research satellite will be put into orbit around the earth's poles. Two years later the data and TV satellite Tele-X will assume an orbit perpendicular to that of Viking--around the equator, where it will act as a telecommunications satellite.

Somewhat like a winged chest of drawers, in several years Tele-X will hover above the equator at 36,000 km with its transmitting and receiving antennas carefully directed toward the Nordic countries. This is the Swedish-Norwegian-Finnish telecommunications satellite that has been developed in the shadow of the constant quarreling over Nordsat.

Anywhere in the Nordic coverage area a small parabolic antenna may send a message--data signals, dititized telephone or facsimile signals--in the form of a radio wave to the satellite hovering invisibly in the southern sky, just above the horizon.

Another radio wave returns immediately from the satellite with the same message which may be received with a similar antenna somewhere else within the coverage area.

It is almost like bouncing a message off a mirror high in the sky instead of sending it along telecommunications lines.

It will be extremely simple from a consumer standpoint, almost like dialing a computer service on the telephone. The satellite will handle up to 500 transmissions simultaneously.

Elephant Ears

The trend in telecommunications satellites is toward larger and heavier satellites and this is also clear from Tele-X. It will be large, weighing

2 tons and 4.5 m high including the antenna tower. The solar panels, which will be extended in the strong sunlight of space like two elephant ears, have a total span of 19 m. They will deliver 3 kW electric power, primarily to the many transmitting tubes of the satellite.

The larger the satellites are, the greater their transmitting power and, thus, the smaller and less expensive the terminals on earth need to be. Tele-X is specially designed for tests involving the rapid transmission of data for computers as well as telex, telephony, facsimile, etc. Wave propagation experiments and direct TV tests will also be made. The satellite has two TV channels for direct transmission to homes and may be used as a kind of reduced Nordsat.

Video Conference

It can also be used for video conferences if the participants remember not to speak at the same time. Otherwise, the same type of blocking effects could occur that occur in lively satellite telephone conversations. Since the signal must travel 36,000 km into space and then back again, there is a delay of several tenths of a second. You do not see and hear what the other person is saying, but what he or she just said.

According to plans, Tele-X will be launched from Kourou in French Guyana by the European Ariane 2 rocket. Once it is in orbit around the earth, it will direct its antennas toward earth. It has infrared sensors that distinguish between the warm earth and cold space.

Fine adjustment of the transmitting antenna toward the Nordic coverage area is extremely important. It must be made within 1/500 of a degree for the satellite's capacity to be best utilized. It will seek a transmitter on earth (in Kiruna) that will send up a control signal.

Slave Connected

The satellite's receiving antenna is "slave connected" to the transmitting antenna and is directed automatically to the same area. It is then ready to receive signals from earth, amplify them, and send them back.

The parabolic antennas at stations on earth need [illegible] be directed so carefully, but may be bolted in place permanently on the r[illegible] the customers. Their radio waves are so broad that they cover the sa[illegible]e even when it drifts slightly in the southern sky.

And the satellite will drift. A geostationary satellite does not stay still, regardless of how carefully it is placed at the right velocity, at the right altitude, and in the right position above the equator.

First of all, the earth's gravitational field (force of attraction) is different in different places. There are several points around the equator toward which satellites are attracted--the strongest is the gravitational depression below the sea south of Ceylon.

Secondly, the sun and moon tend to attract the satellite in a north-south direction.

Autoignition

For this reason, it is equipped with small jets that occasionally push it back into place. Over 100 kg fuel is on board--nitrogen tetroxide and monomethylhydrazine, which ignite when mixed in the combustion chamber of the rocket. These substances have good storage properties, which are needed since the satellite's estimated lifetime is about 5 years.

Both the satellite and ground equipment will be developed and manufactured by Nordic companies in cooperation with West German and French industry. In Sweden Saab-Scania and LM Ericsson are primarily involved.

An important aspect of the project is gaining experience for Swedish industry in large and ultramodern communications systems. The project will cost a total of 1.25 billion kronor, of which Sweden will be responsible for 800 million.

Hammer Thrower

In several years when the Swedish space research satellite Viking is hovering above the North and South poles in an orbit up to 15,000 km, it probably will look something like an unusually hesitant hammer thrower.

The satellite will roll along on edge like a cake pan swinging four metal balls around it on 40 meter long lines. This is an antenna system for measuring field strengths and waves in the plasma surrounding the earth at high altitudes.

Viking's task is to investigate the magnetosphere at altitudes between 4,000 and 15,000 km. In this region there is a complicated interplay between warm and cold plasmas, i.e. thin ionized gases that move in the earth's magnetic field. The secrets of the northern lights are hidden here, perhaps along with the causes of the weather and climate on earth.

Compared to the gigantic Tele-X, Viking is a modest piece of equipment. It looks like an octagonal cake pan 0.5 m high, 2 m in diameter, with eight sides covered with solar panels to supply electricity. Once in orbit, it will look quite straggly with all 10 antennas and instrument arms sticking out in all directions.

In the beginning, it will weigh about 0.5 tons, but almost half of this is fuel for the rocket that will hurl it into its final, highly elliptical orbit. the highest point of which is greater than the earth's diameter.

Viking will be launched in May 1984 along with the French remote analysis satellite Spot which will be placed into orbit over the poles at an altitude of 800 km.

Stable

Later the carrier rocket will release Viking, but only after it is given a spinning motion that stabilizes it in space similar to the motion of a gyroscope. On the edges of Viking are small spin rockets aimed to the sides for increasing the rotation to almost 1 revolution per second.

This will give the satellite the necessary stability when its own large rocket engine is ignited, launching it into its enormous orbit, 18 times higher than Spot.

Once the satellite is in the proper orbit, the same spin rockets will slow the rotation again so that all arms and antennas can be extended and the satellite can make contact with its ground station, the Esrange base in Kiruna, for the first time.

The "hammers" mentioned above are then drawn out by centrifugal force as the satellite rotates. The rotation then becomes slower, for the same reason (conservation of momentum) that a whirling ice skater spins more slowly as she stretches out her arms.

When the "hammers" are completely extended, the rotation of the satellite is extremely slow--3 revolutions per minute. The rotation is controlled by electromagnetic coils in the satellite. When current of varying direction and strength passes through these coils, the entire satellite turns in the earth's magnetic field, just like the rotor turns in an electric motor.

Remotely Controlled

With this mechanism, remotely controlled by radio from earth, not only can the rotation be increased or decreased, but the entire satellite may be turned laterally.

It will be like turning an unwieldy, 80 m high flywheel a half rotation laterally--a process that will take 50 days.

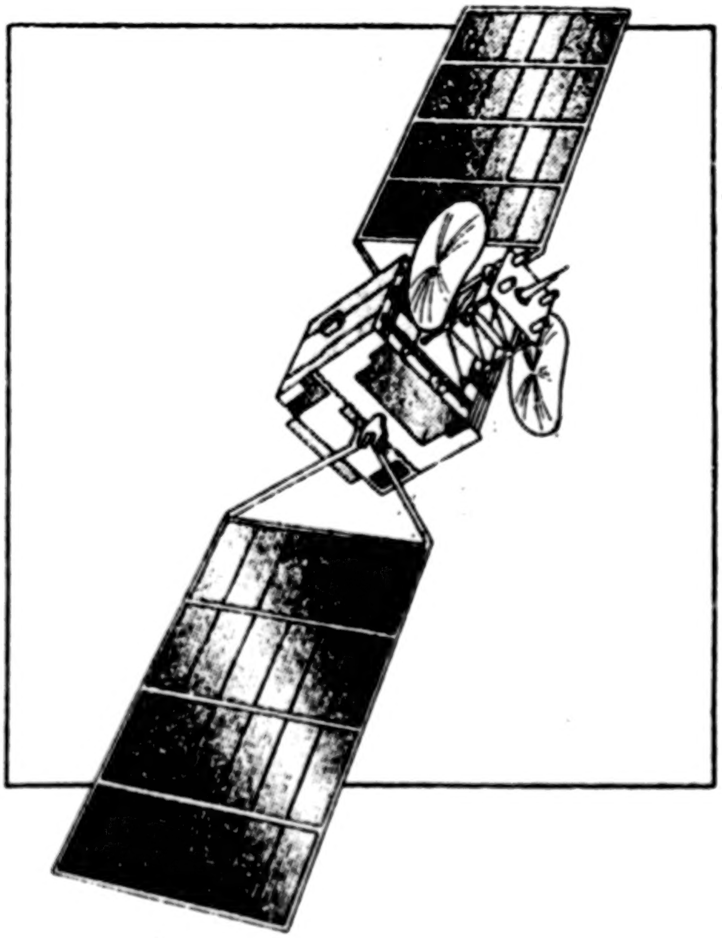
It must be done after about 4 months, however, for by that time the earth and the satellite in their common orbit around the sun will be in such a position that the sun would shine directly on the satellite's sensitive instruments, all of which are on one side--the top side of the "cake pan." After the turn the instruments will be safely in the shade again for the remainder of the satellite's lifetime--an additional 4 months.

Northern Lights

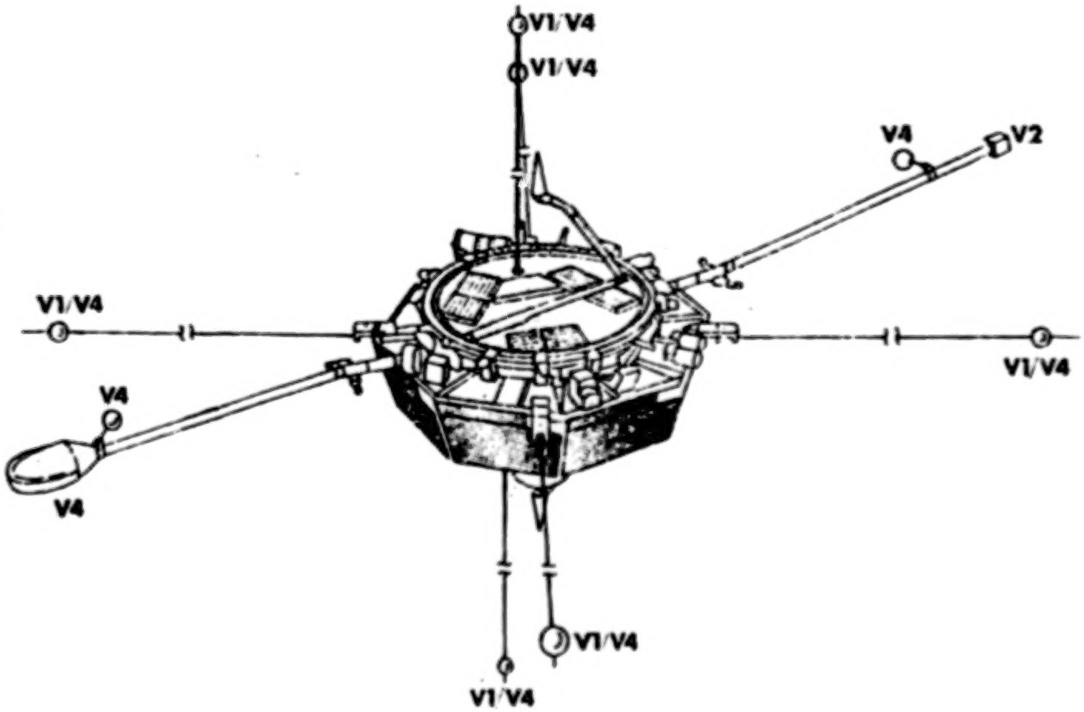
The instruments will measure the electric and magnetic fields, as well as waves and particles. There is also a "camera" that will take pictures of ultraviolet light in the northern lights, which from this height look like an oval halo of light over the earth.

The "hammers" farthest out on the slowly rotating lines actually are sensors for measuring potential differences between two points up to 80 m apart.

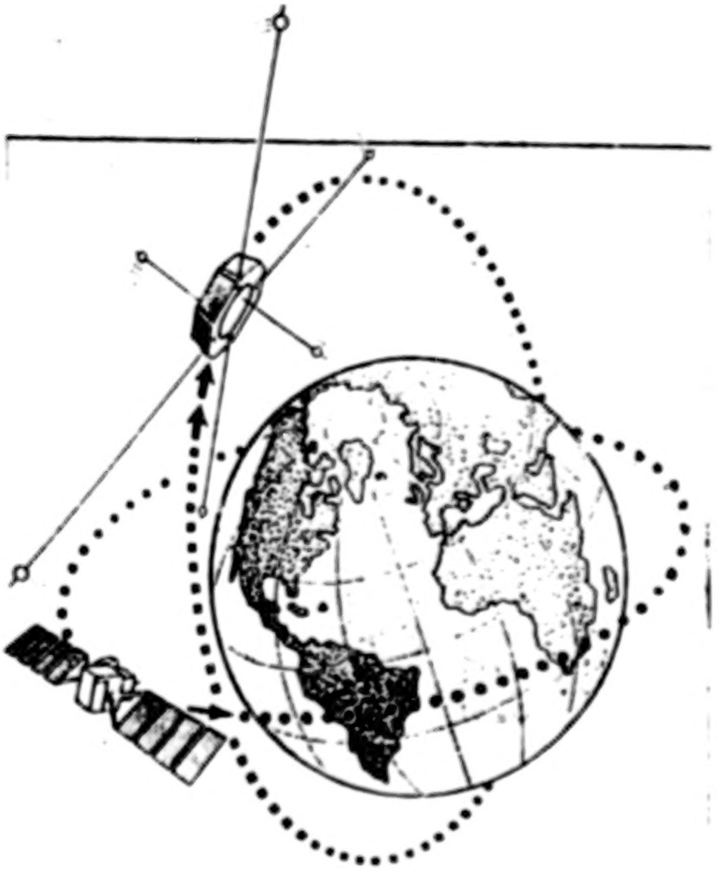
All data, 7,000 measurements per second, is sent in digital form by radio to Esrange in Kiruna, which is project headquarters on earth. Swedish, American, and Canadian researchers are involved in the experiment. The cost is estimated at 106 million kronor.



The Tele-X satellite is dominated by the large solar panels. The two oval plates are the transmitting and receiving antennas.



Antennas and arms stick out in all directions from the Viking satellite for measuring the thin plasma of the magnetosphere. V1 and V4 stand for measurements of electrical fields and waves and V2 is for magnetic measurements. The satellite is surrounded by eight solar panels and the ring on the upper side contains three "vents" for allowing heat to escape from the inside of the satellite.



Swedish satellites in north-south and east-west orbits around the earth in several years are shown here. Viking, with its long sensors, is in orbit over the poles and Tele-X is "still" in a so-called geosynchronous orbit high above the equator.

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DATE FILMED

May 25, 1982